



Melitidae, the *Melita* group*

J.K. LOWRY & R.T. SPRINGTHORPE

Crustacea section, Australian Museum, 6 College Street, Sydney, New South Wales, 2010, Australia.

(jim.lowry@austmus.gov.au; roger.springthorpe@austmus.gov.au)

* In: Lowry, J.K. & Myers, A.A. (Eds) (2009) Benthic Amphipoda (Crustacea: Peracarida) of the Great Barrier Reef, Australia. *Zootaxa*, 2260, 1–930.

Abstract

In the *Melita* group, new records of *Dulichieilla pacifica* Lowry & Springthorpe are reported from the Great Barrier Reef. The record of *Dulichieilla australis* (Haswell) from the GBR is rejected. The genus *Melita* (*M. myersi* G. Karaman and *M. sampsonae* **sp. nov.**) is reported from the GBR for the first time. The genus *Tegano* Barnard & Karaman is amended and reported from Australian (*T. atkinsae* **sp. nov.**), New Caledonian (*T. levis* (Stock & Iliffe)) and Japanese (*T. shiodamari* (Yamato)) waters for the first time.

Key words: Crustacea, Amphipoda, Melitidae, *Melita* group, Great Barrier Reef, Australia, taxonomy, new species, *Dulichieilla pacifica*, *Melita sampsonae*, *Melita myersi*, *Tegano atkinsae*

Introduction

The recent description of the Maeridae Krapp-Schickel, 2008 excluded 40 genera from the Melitidae (Krapp-Schickel 2008; Lowry & Hughes 2009). This still leaves about 45 genera in four or five groups within the Melitidae (*sensu lato*). The *Melita* group of 22 genera is mainly characterised by: a laterally compressed body; small, dorsal robust setae on urosomite 2; a basofacial seta on the peduncle of uropod 1; a scale-like inner ramus; and elongate outer ramus on uropod 3 which is 1– or 2–articulate, with article 2, when present, short or long, never greatly elongate.

Morphological evidence indicates that the *Melita* group is, at least superficially, most similar to the European groundwater family Niphargidae, although recent molecular studies (Englisch *et al.* (2003) indicate that niphargids might be a sister group to the Crangonyctidae. Englisch *et al.* (2003) did not find a close relationship between niphargids and melitids, however the taxa they analysed within the Melitidae (*sensu lato*) belong to the recently established Maeridae Krapp-Schickel, 2008. The main differences between niphargids and the *Melita* group include: side of the head is strongly excavate and first article of the antenna 2 peduncle enlarged and bulbous in niphargids (not strongly excavate and not enlarged in the *Melita* group); second gnathopods sexually dimorphic in the *Melita* group (not sexually dimorphic in niphargids); and presence of a large distoventral robust seta on urosomite 1 in niphargids (not present in the *Melita* group); coupled with the presence of a basofacial seta on the peduncle of uropod 1 in the *Melita* group (not present in the niphargids) (fig. 1).

In this paper four species in the *Melita* group are reported from the Great Barrier Reef. We redescribe *Dulichieilla pacifica* Lowry & Springthorpe, 2005 and report new records from the Great Barrier Reef. *Dulichieilla australis* (Haswell, 1879) was reported from Lizard Island by Lowry & Springthorpe (2005). We are now convinced that, although the specimen was *D. australis*, the locality on the label was incorrect. It only

said '*Dulichella australis*, Lizard Island', with no other data. We have never collected *D. australis* from the GBR. We report, for the first time, two species of *Melita* (*M. myersi* G. Karaman, 1987 and *M. sampsonae* **sp. nov.**) from the GBR. The genus *Tegano* Barnard & Karaman, 1982 is reported from Australian (*T. atkinsae* **sp. nov.**), New Caledonian (*T. levis* (Stock & Iliffe, 1995)) and Japanese (*T. shiodamari* (Yamato, 1995)) waters for the first time. *Tegano* was previously known from Sri Lanka in the Indian Ocean, and Palau, the Philippine Islands and the Solomon Islands, in the tropical western Pacific Ocean.

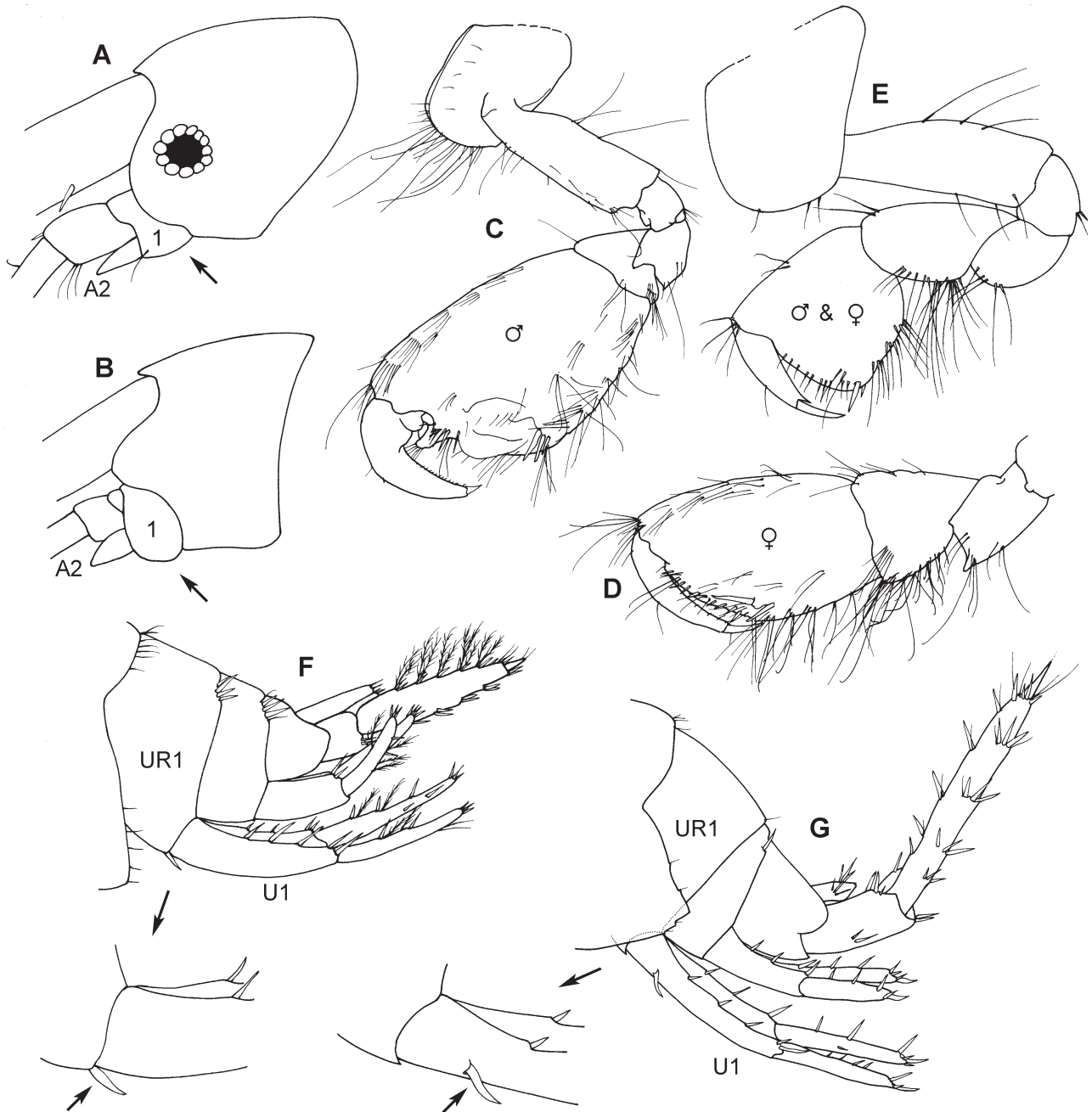


FIGURE 1. Main differences between the Niphargidae and the *Melita* group (Melitidae): antenna 2 peduncular article 1, A (*Melita myersi*), B (*Niphargus carcerarius*); gnathopod 2 sexually dimorphic, C, D (*Melita matilda*), E (*Niphargus strouhali alpinus*); distoventral robust seta on urosomite 1, F (*Niphargus carcerarius*); basofacial seta on the peduncle of uropod 1, G (*Melita awa*), (B, F after Karaman 1986; E after Karaman 1988).

Materials and methods

The descriptions were generated from a DELTA database (Dallwitz, 2005) to the melitid species of the world. Material was hand-collected on scuba or snorkel and is lodged in the Australian Museum, Sydney (AM). A set of colour plates, a list of standard abbreviations and detailed station data is available in Lowry & Myers (2009). A CD (*Benthic Amphipoda (Crustacea: Peracarida) of the Great Barrier Reef: Interactive Keys*) is available with the book or the keys can be accessed at the crustacea.net website.

Melitidae Bousfield, 1973

Dulichchiella Stout, 1912

Dulichchiella pacifica Lowry & Springthorpe, 2005

(Figs 2, 3)

Dulichchiella appendiculata. —Berents, 1983: 111, fig. 9. —Ledoyer, 1984: 64. —Ledoyer, 1986: 187, fig. 9 N Cal.

Dulichchiella pacifica. —Lowry & Springthorpe, 2005: 292, figs 54–57. —Lowry & Springthorpe, 2007: 40, figs 30–32.

Material examined. 1 specimen, AM P30123 (75 LIZ D-1); 6 specimens, AM P30124 (QLD 2); 1 specimen, AM P77738 (QLD 21); 5 specimens, AM P30125 (QLD 27); 2 specimens, AM P30126 (QLD 28); 1 specimen, AM P77739 (QLD 57); 1 specimen, AM P70836 (QLD 1661); 1 specimen, AM P70920 (QLD 1682); 2 specimens, AM P70921 (QLD 1686); 1 specimen, AM P70916 (QLD 1691); 6 specimens, AM P70946 (QLD 1696); 1 specimen, AM P71005 (QLD 1707); 2 specimens, AM P71950 (QLD 1707); 1 female, 6.1 mm, AM P75510 (QLD 1707); 8 specimens, AM P71105 (QLD 1710); 3 specimens, AM P71051 (QLD 1718); 1 specimen, AM P71129 (QLD 1750); 1 specimen, AM P71214 (QLD 1760); 1 specimen, AM P71224 (QLD 1760); 7 specimens, AM P71231 (QLD 1760); 2 specimens, AM P71364 (QLD 1800); 1 male, 5.2 mm, AM P75509 (QLD 1800); 5 specimens, AM P71355 (QLD 1803); 4 specimens, AM P71543 (QLD 1823); 1 specimen, AM P71600 (QLD 1838); 3 specimens, AM P75618 (QLD 1940); 3 specimens, AM P75705 (QLD 1940); 1 specimen, AM P75619 (QLD 1970); 2 specimens, AM P75704 (QLD 1970); male, 3.9 mm, AM P77740 (QLD 1970).

Type locality. Coral rubble between Tandai Point and Koilo Point, Guadalcanal, Solomon Islands (9°22.5'S 159°52.2'E).

Description. Based on male, 5.2 mm, AM P75509 and male, 3.9 mm, AM P77740..

Head and body. *Body* small. *Head* eyes round; lateral cephalic lobe broad, truncated, anteroventral corner with slender seta. *Antenna 1* peduncular article 1 shorter than article 2, with 3 robust setae along posterior margin. *Antenna 2* peduncular article 2 cone gland reaching at least to end of peduncular article 3; article 4 subequal to article 5. *Mandible* palp article 1 about as long as broad, inner margin produced distally; article 2 subequal to article 3.

Pereon. *Gnathopod 1* coxa anteroventral corner not produced, anterior margin straight, posteroventral corner notch present; carpus subequal in length to propodus; propodus small, linear, palm convex, without posterodistal corner, with posterodistal robust setae. *Gnathopod 2* asymmetrical (larger) chelate, coxa posteroventral corner notch present; propodus distolateral crown with 4 rounded or subacute spines, fourth spine well developed, palm straight, posterodistal corner produced, upturned, dactylus fitting into corner; dactylus apically blunt; (smaller) subchelate, merus with sharp posteroventral spine; palm convex, without robust setae, posterodistal corner with robust setae; dactylus with 1 or 2 setae on anterior margin. *Pereopod 5* dactylar unguis anterior margin with accessory spine. *Pereopods 6–7* carpus and propodus with bunches of long slender setae. *Pereopod 6* basis posterior margin slightly concave; dactylar unguis anterior margin with one accessory spine. *Pereopod 7* basis posterior margin straight.

Pleon. *Pleonite/urosomite* dorsal spine formula (7-7-7-5-4/6-2). *Pleonites* 1–3 with sparse dorsal setae. *Epimeron* 1 posteroventral corner with small acute spine. *Epimeron* 2 posteroventral corner acute. *Epimeron* 3 posteroventral margin smooth. *Urosomite* 1 with 5 dorsal spines. *Urosomite* 2 with two groups of 1–3 small dorsolateral robust setae. *Urosomite* 3 without dorsal setae, with 2 dorsal spines. *Uropod* 3 outer ramus very long, about 2 x peduncle. *Telson* with dorsal robust setae.

Female (sexually dimorphic characters). Based on female, 6.1 mm, AM P75510. *Gnathopod* 2 symmetrical, subchelate, subequal in size, similar to smaller *gnathopod* 2 of male; palm concave; dactylus posterior margin smooth, with 5 setae on anterior margin. *Pereopod* 7 basis expanded, posterior margin convex and tapering distally.

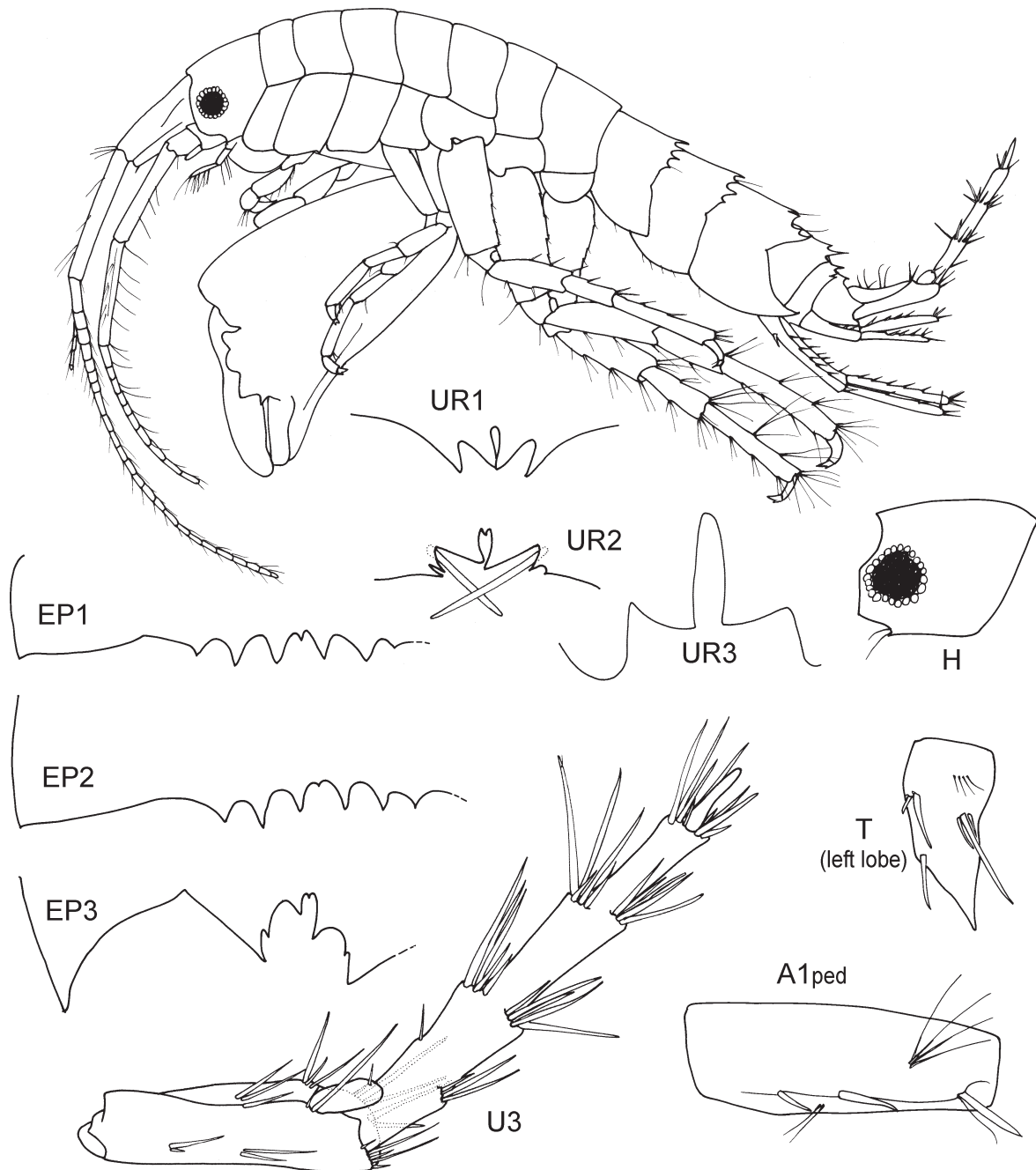


FIGURE 2. *Dulichiella pacifica* Lowry & Springthorpe, 2007, habitus, male, 3.9 mm, AM P77740, Third Lagoon, One Tree Island, male, 5.0 mm, AM P75509, Yonge Reef, Great Barrier Reef.

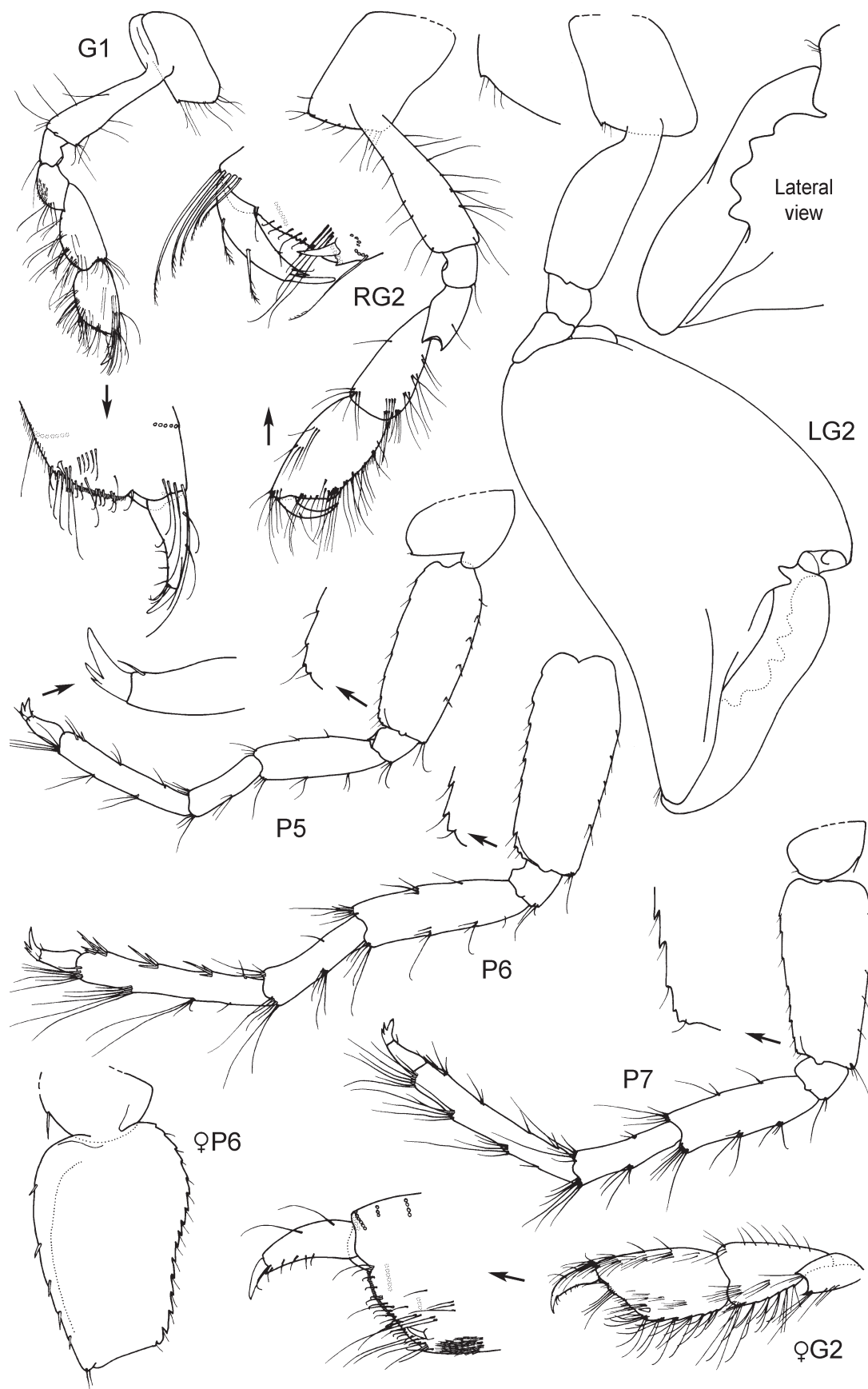


FIGURE 3. *Dulichiella pacifica* Lowry & Springthorpe, 2007, male, 5.0 mm, AM P75509, female, 6.1 mm, AM P75510, Yonge Reef, Great Barrier Reef.

Habitat. Marine epibenthic, living among coral rubble, sponges, sand and low algal turf in 10 to 20 m depth.

Remarks. *Dulichchiella pacifica* has four spines on the distolateral crown of male gnathopod 2 and a 7-7-7-5-4/6-2 pleonite/urosomite formula. Four other species share these characters: *D. appendiculata*; *D. fresnelii*; *D. lecrovayae*; and *D. cuvettensis*.

Dulichchiella pacifica is most similar to *D. cuvettensis* and *D. fresnelii*. It differs from *D. cuvettensis* in having one accessory spine on the dactyli of pereopods 5 to 7 (two accessory spines in *D. cuvettensis*) and in having bunches of long, slender setae on the carpus and propodus of male pereopods 6 and 7 which are absent in *D. cuvettensis*. *Dulichchiella pacifica* differs from *D. fresnelii* in the posterior margin of the basis of pereopod 6 which is concave in *D. pacifica* and straight in *D. fresnelii* and in the posterior margin of the basis of pereopod 7 which is straight in *D. pacifica* and tapering distally in *D. fresnelii*.

Dulichchiella pacifica is a common shallow-water species in Singapore, New Guinea, New Caledonia, the Solomon Islands and north-eastern Australia. *Dulichchiella* has not been reported from Micronesia (J.L. Barnard 1965) or Fiji (Myers 1985). On the Great Barrier Reef *D. pacifica* occurs from Yonge Reef in the north to One Tree Island near the southern end.

Distribution. *Australia*. Queensland: Yonge Reef; Lizard Island; One Tree Island (current study, Lowry & Springthorpe 2005). *Singapore* (Lowry & Springthorpe 2005). *Papua New Guinea*. Madang Lagoon (Lowry & Springthorpe 2005). *Solomon Islands*. Guadalcanal (Lowry & Springthorpe 2005). *New Caledonia*: Poé Plage, West Lagoon; Thio, East Lagoon; Southwest Lagoon (Lowry & Springthorpe 2005).

Melita Leach, 1814

***Melita myersi* G. Karaman, 1987**

(Figs 4, 5)

Melita zeylanica. —Myers, 1985: 125, figs 98–99.

Melita myersi G. Karaman, 1987: 30.

Material examined. 1 specimen, AM P55298 (QLD 36); 1 male, 4.4 mm, AM P55295 (QLD 42); 1 female 3.9 mm, AM P55296 (QLD 42); 2 specimens, AM P55297 (QLD 42); 4 specimens, AM P77779 (SEL/LZI-1-1); 1 male, AM P47332, (NCL 140).

Type locality. Mangroves, Lucala Island, Fiji (~18°10'S 178°30'E).

Description. Based on male, 4.4 mm, AM P55295.

Head. *Head* lateral cephalic lobe broad, apically rounded; eyes well developed, ovate; anteroventral margin without notch or slit, slightly recessed, anteroventral corner rounded. *Antenna 1* longer than antenna 2; peduncular article 1 shorter than article 2, with 3 robust setae along posterior margin; peduncular article 2 longer than article 3; accessory flagellum minute with 2 articles; flagellum with 11 articles. *Antenna 2* not strongly setose; peduncular article 4 subequal to article 5; flagellum with 6 articles. *Mandible* molar medium size; accessory setal row well developed; palp well developed, 3-articulate; article 1 about as long as broad, not produced distally; article 2 longer than article 3; article 3 well developed, slightly tapering distally, with setae mostly terminal. *Maxilla 1* inner plate long, subrectangular, with mainly apical setae. *Maxilla 2* inner plate without oblique setal row on inner face, without marginal setal row. *Lower lip* inner lobes vestigial or absent. *Maxilliped* palp article 3, about as long as broad.

Pereon. *Gnathopod 1* sexually dimorphic; coxa anteroventral corner not produced, anterior margin straight; merus without posterodistal tooth; carpus about 2 x as long as broad, longer (1.3x) than propodus; propodus without hump along anterior margin, anterodistal projection forming rounded hood over dactylus, palm obtuse, convex, entire, without narrow anterodistal projection near base of dactylus, posterodistal margin not swollen, palm defined by posterodistal corner, corner with posterodistal robust setae; dactylus

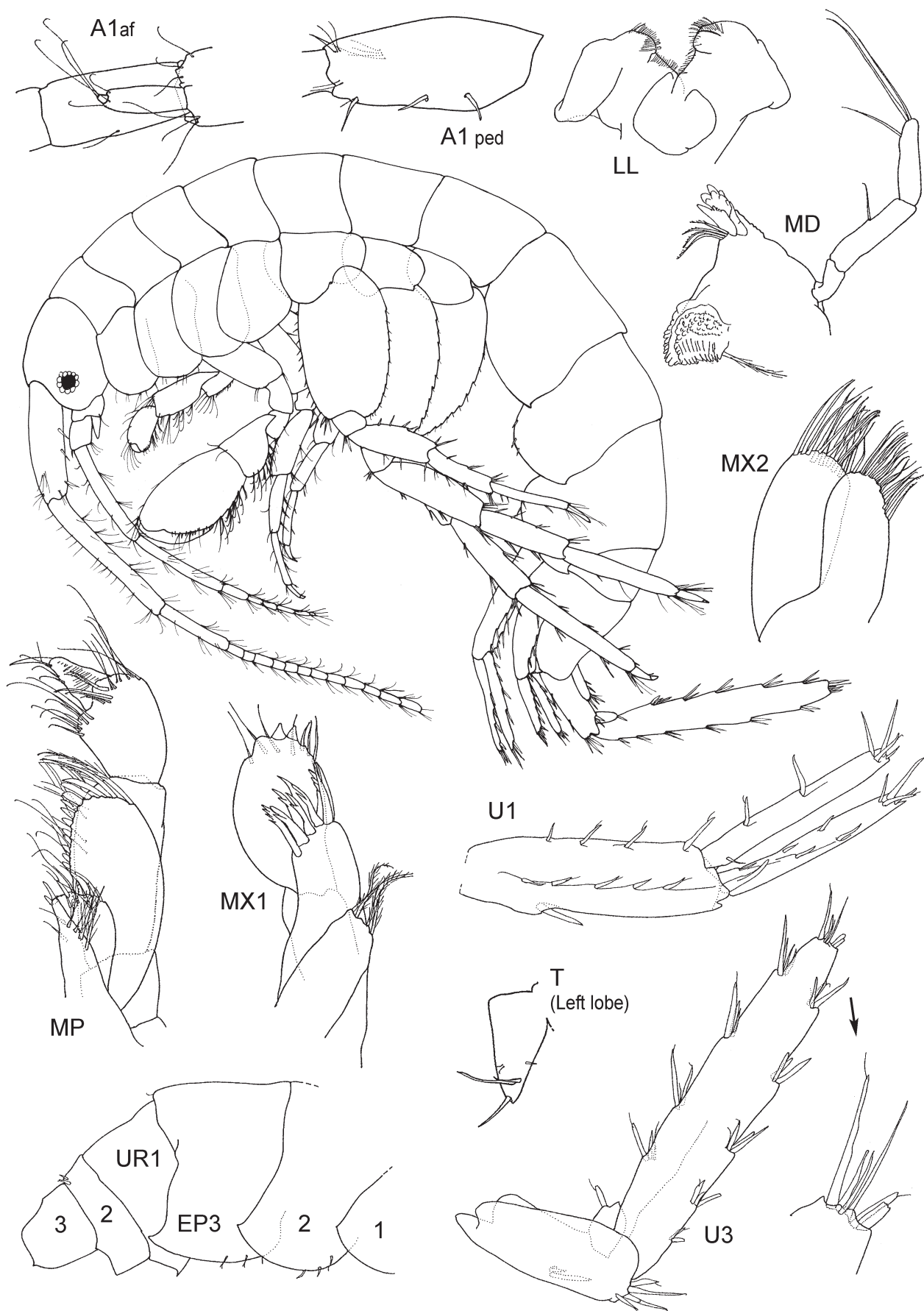


FIGURE 4. *Melita myersi* Karaman, 1987, male, 4.4 mm, AM P55295, Mangrove Beach, Lizard Island, Great Barrier Reef.

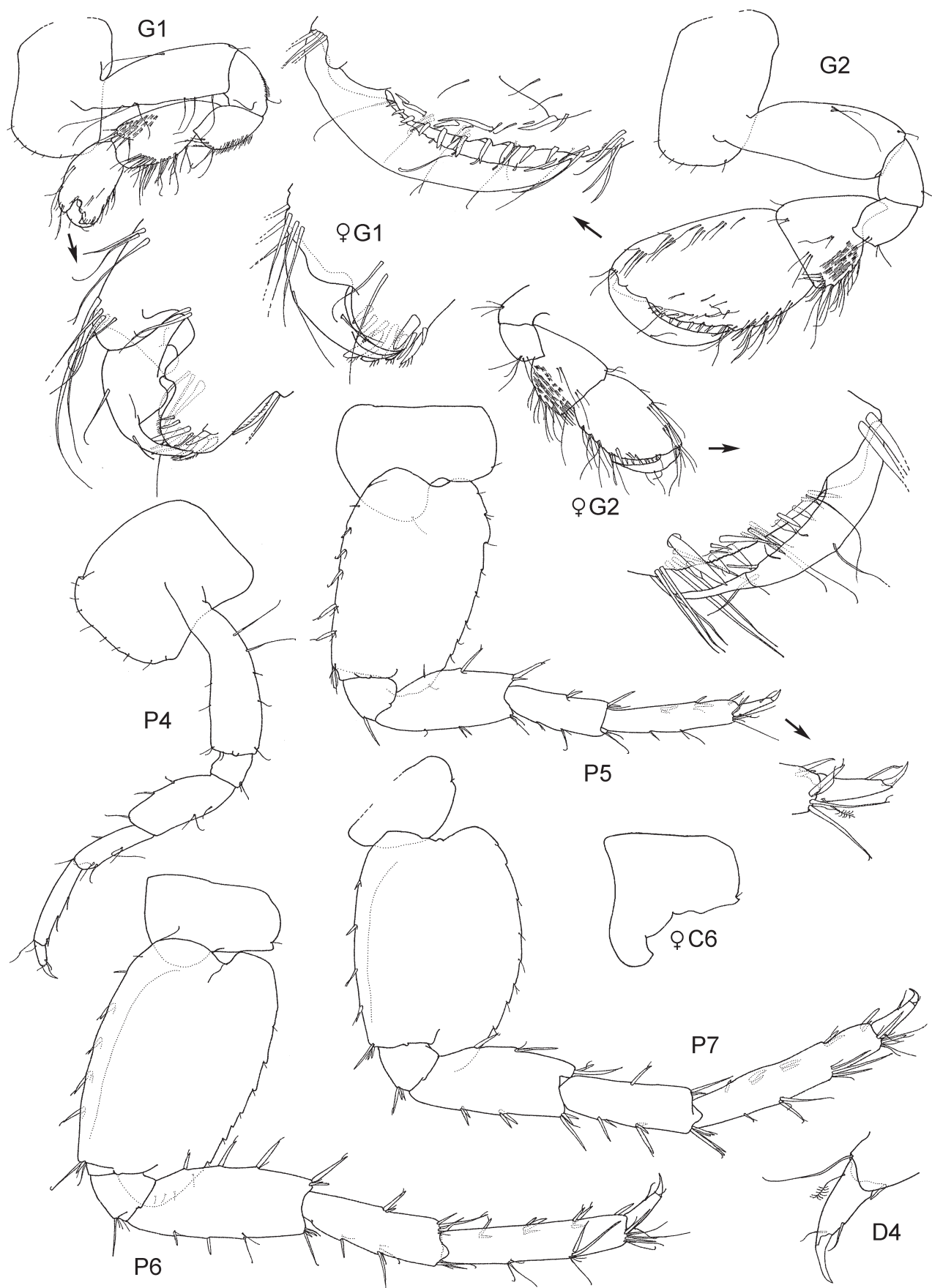


FIGURE 5. *Melita myersi* Karaman, 1987, male, 4.4 mm, AM P55295, female, 3.9 mm, AM P55296, Mangrove Beach, Lizard Island, Great Barrier Reef.

articulating distinctly with propodus, fitting palm, posterior margin swollen at base. *Gnathopod 2* significantly enlarged in male, not in female; sexually dimorphic (size, not shape); subchelate; carpus short, length 1.1 x breadth, not lobate, not enclosed by merus and propodus; merus with subquadrate distoventral corner; propodus without strong concentration of setae, without medial depression, without medial pad, palm acute in male and female, with well defined corner, slightly convex, lined with robust setae, without posteroventral corner, without posterodistal robust setae; dactylus closing along palm, with 1 or 2 setae on anterior margin. *Pereopods 5–6* basis posterior margin minutely castellate. *Pereopod 4* coxa posteroventral lobe absent, posterior margin concave. *Pereopod 5* basis proximally expanded, tapering distally; posterior margin convex, posteroventral corner broadly rounded; carpus and propodus with few (or none) long, slender setae along anterior margin. *Pereopod 6* coxa slightly produced, rounded; basis convex, posteroventral corner broadly rounded. *Pereopod 7* basis posterior margin convex, with posterior margin minutely castelloserrate, evenly rounded posteriorly, produced posterodistally (lobate), posterodistal corner broadly rounded.

Pleon. *Pleonites 1–3* without dorsal spines or setae. *Urosomites 1–3* without dorsal spines. *Epimeron 1* anteroventral corner rounded, posteroventral corner with small acute or subacute spine. *Epimeron 2* posteroventral corner acute. *Epimeron 3* ventral margin smooth, posteroventral corner with strongly produced acute spine, posteroventral margin smooth. *Urosomite 2* with 2 groups of 2 small dorsolateral robust setae. *Urosomite 3* without dorsal setae. *Uropod 1* peduncle with basofacial robust seta. *Uropod 3* rami distally truncated; inner ramus scale-like, much shorter than outer ramus; outer ramus very long, length 5 x breadth, much longer (about 2.5 x) than peduncle, 1-articulate. *Telson* cleft, as long as broad, lobes apically acute, without dorsal robust setae, each lobe with 3 apical/subapical long, robust setae, apical/subapical with robust setae on inner margins, absent on outer margins.

Female (sexually dimorphic characters). Based on a female, 3.9 mm, AM P55296. *Gnathopod 1* propodus without anterodistal hood. *Gnathopod 2* carpus long, length 1.5 x breadth; propodus palm smooth. *Pereopod 6* coxa anterior lobe ventral margin strongly produced, curved posteriorly and rounded.

Habitat. Marine or estuarine among mangroves.

Remarks. Karaman (1987) recognized that Myers (1985) had actually described a new species which he mistakenly called *M. zeylanica* Stebbing, 1904 and assigned the new name, *M. myersi*, to the taxon.

The mouthparts of *M. myersi* are illustrated here for the first time. We examined a number of specimens from Fiji and found a range of articles (11 to 23) on the flagellum of antenna 2. The original illustration (Myers 1985) of the anterodistal hood on the propodus of the male gnathopod 1 is not convincing unless the medial suture is not drawn. However Myers (1985) states that his specimens have the aberrant 'melitoid' gnathopod 1 of *M. zeylanica*. Urosomite 2 has 4 small robust setae in two bundles, not 3 as indicated in Myers (1985).

Based on this evidence we are reporting specimens of this species from the same and similar habitats in New Caledonia and at Lizard Island in north-eastern Australia.

Melita myersi appears to be most similar to *Melita laevidorsum* Stephensen, 1944 from Japan. Both species have the anterodistal hood on the propodus of male gnathopod 1, the dactylus of male gnathopod 2 closing along the palm and the coxa of pereopod 4 without a posterodistal lobe. *Melita laevidorsum* differs from *M. myersi* in having a better developed accessory flagellum and less expanded bases on pereopod 5–7.

Distribution. *Australia.* Lizard Island (current study). *Fiji.* Suva and Lucala Island (Myers 1985). *New Caledonia.* Poé Plage (current study).

Melita sampsonae sp. nov.

(Figs 6, 7)

Type material. Holotype, male, 4.2 mm, AM P77779, Mermaid Cove, Lizard Island (14°38.90'S 145°27.26'E), swash/subtidal, protected beach with patch reefs offshore, coarse coral sand with pieces of coral, 0.5–1.0 m, S.E. LeCroy, 2 July 2001 (SEL/LZI-1-1). Paratypes: female ovigerous, 3.4 mm, AM

P77780, male, 4.8 mm, AM P77781, type locality.

Type locality. Mermaid Cove, Lizard Island (14°38.90'S 145°27.26'E).

Etymology. Named for Marilyn Sampson (Australian Museum Members), in recognition of the support of the Australian Museum Members for the Lizard Island Amphipod Workshop in 2005.

Description. Based on holotype, male, 4.2 mm, AM P77779.

Head. *Head* lateral cephalic lobe broad, apically rounded; eyes well developed, ovate; anteroventral margin with anteroventral notch, anteroventral margin with small ventral notch, anteroventral corner rounded. *Antenna 1* slightly longer than antenna 2; peduncular article 1 subequal in length to article 2, with 3 robust setae along posterior margin; peduncular article 2 not geniculate, article 2 longer than article 3; accessory flagellum short, minute, with 3 articles (third tiny); flagellum with 15 articles. *Antenna 2* not strongly setose; peduncular article 4 longer than article 5; flagellum with 6 articles. *Mandible* molar medium size; accessory setal row well developed; palp well developed, 3-articulate; article 1 about as long as broad, not produced distally; article 2 subequal to article 3; article 3 well developed, slightly tapering distally, setae along both margins and terminal. *Maxilla 1* inner plate long, subrectangular, with 7 mainly apical setae. *Maxilla 2* inner plate without oblique setal row on inner face, with marginal setal row. *Lower lip* inner lobes vestigial or absent. *Maxilliped* palp article 3, about 1.5 x as long as wide.

Pereon. *Gnathopod 1* sexually dimorphic; coxa anteroventral corner not produced, anterior margin straight; merus without posterodistal tooth; carpus about 2 x as long as broad, carpus longer than propodus, length 1.3 x propodus; propodus without hump along anterior margin, anterodistal projection forming triangular hood over dactylus, palm nearly transverse, straight, entire, without anterodistal projection near base of dactylus, posterodistal margin not swollen, defined by posterodistal corner, corner without posterodistal robust setae; dactylus articulating distinctly with propodus, fitting palm, posterior margin swollen at base. *Gnathopod 2* significantly enlarged in male, not in female, sexually dimorphic (size and shape); subchelate; carpus compressed, length 0.8 x breadth, lobate, projecting between merus and propodus; merus acutely produced distoventrally; propodus expanded, with strong setal bunch, with medial depression, forming posteromedial channel, palm acute in male and female, extremely acute without corner, convex, smooth, lined with robust setae, without posteroventral corner, with posterodistal robust setae; dactylus closing across medial surface of propodus, reaching end of palm, without setae on anterior margin. *Pereopod 4* coxa posteroventral lobe well developed, subrectangular. *Pereopod 5* basis expanded; posterior margin convex, posteroventral corner broadly rounded; carpus and propodus with few (or none) long, slender setae along anterior margin. *Pereopod 6* coxa slightly produced, rounded; basis slightly convex, posteroventral corner narrowly rounded or subquadrate. *Pereopod 7* basis posterior margin convex, with posterior margin smooth or minutely castelloserrate, evenly rounded posteriorly, produced posterodistally (lobate), posteroventral corner insignificant.

Pleon. *Pleonites 1–3* without dorsal spines or seta. *Urosomites 1–3* without dorsal spines. *Epimeron 1* anteroventral corner rounded, posteroventral corner subquadrate. *Epimeron 2* posteroventral corner subquadrate. *Epimeron 3* ventral margin smooth, posteroventral corner with small acute spine, posteroventral margin smooth. *Urosomite 2* posterior margin smooth; dorsally smooth, with 2 groups of 3 tiny robust setae. *Urosomite 3* without dorsal setae. *Uropod 1* with basofacial robust seta. *Uropod 3* rami distally truncated; inner ramus scale-like, much shorter than outer ramus; outer ramus long, length 3 x breadth, about 2 x peduncle, 2-articulate, article 2 short. *Telson* cleft, as long as broad, tapering distally, lobes apically acute or subacute, without dorsal robust setae, with apical/subapical robust setae, each lobe with 3 or more short and long apical/subapical robust setae, with robust setae on outer margins and inner margins, apical conical extension absent.

Female (sexually dimorphic characters). Based on paratype, female, 3.4 mm, AM P77780. *Gnathopod 1* propodus without anterodistal projection, palm convex. *Gnathopod 2* propodus without strong concentration of setae, without medial depression, without medial pad, acute with well defined corner, with sparse robust setae, defined by posteroventral corner; dactylus closing along palm, with 1 or 2 setae on anterior margin. *Pereopod 6* coxa anterior lobe ventral margin strongly produced, hooked.

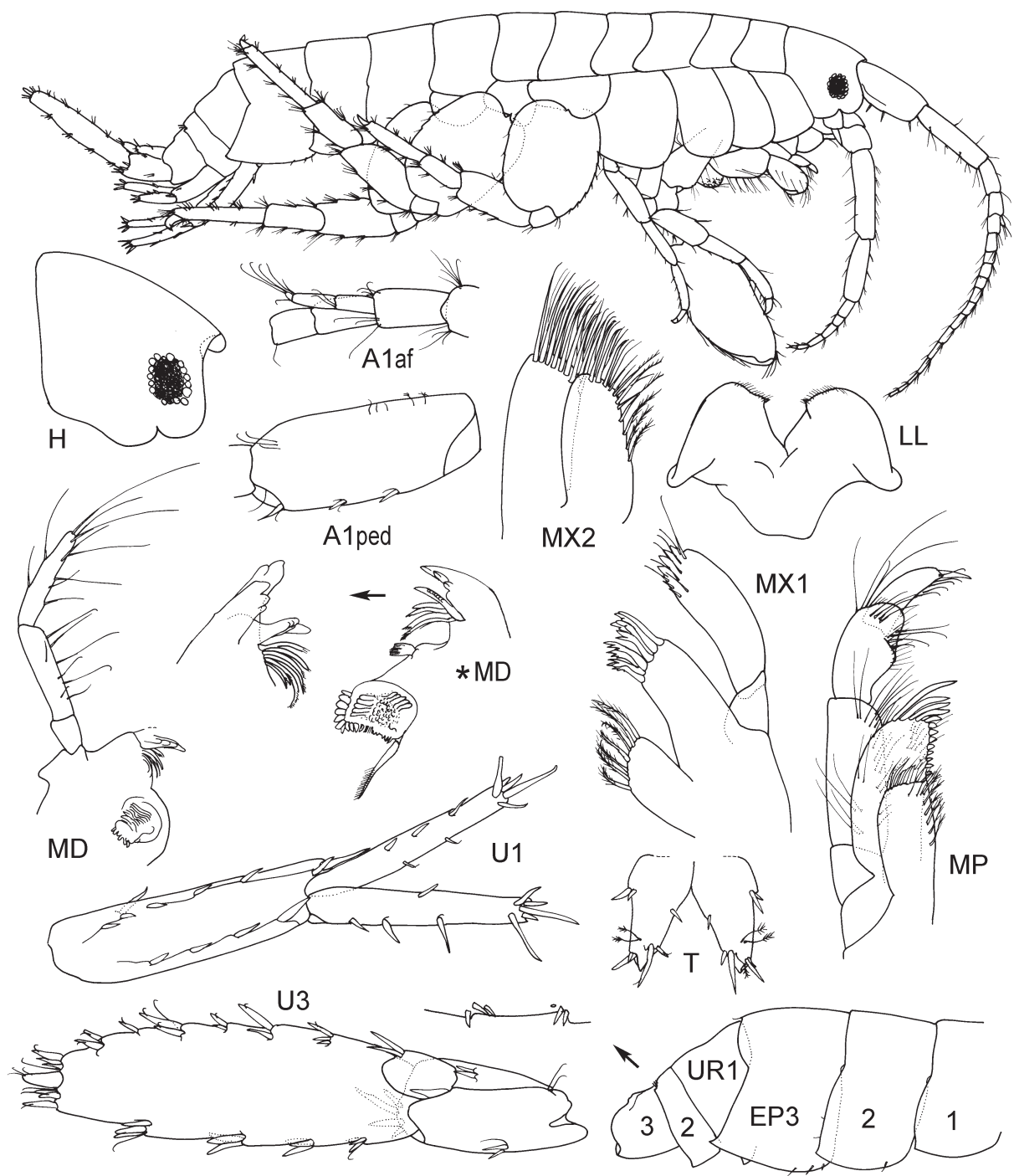


FIGURE 6. *Melita sampsonae* **sp. nov.**, holotype, male, 4.2 mm, AM P77779, *paratype, male, 4.8 mm, AM P77781, Mermaid Cove, Lizard Island, Great Barrier Reef.

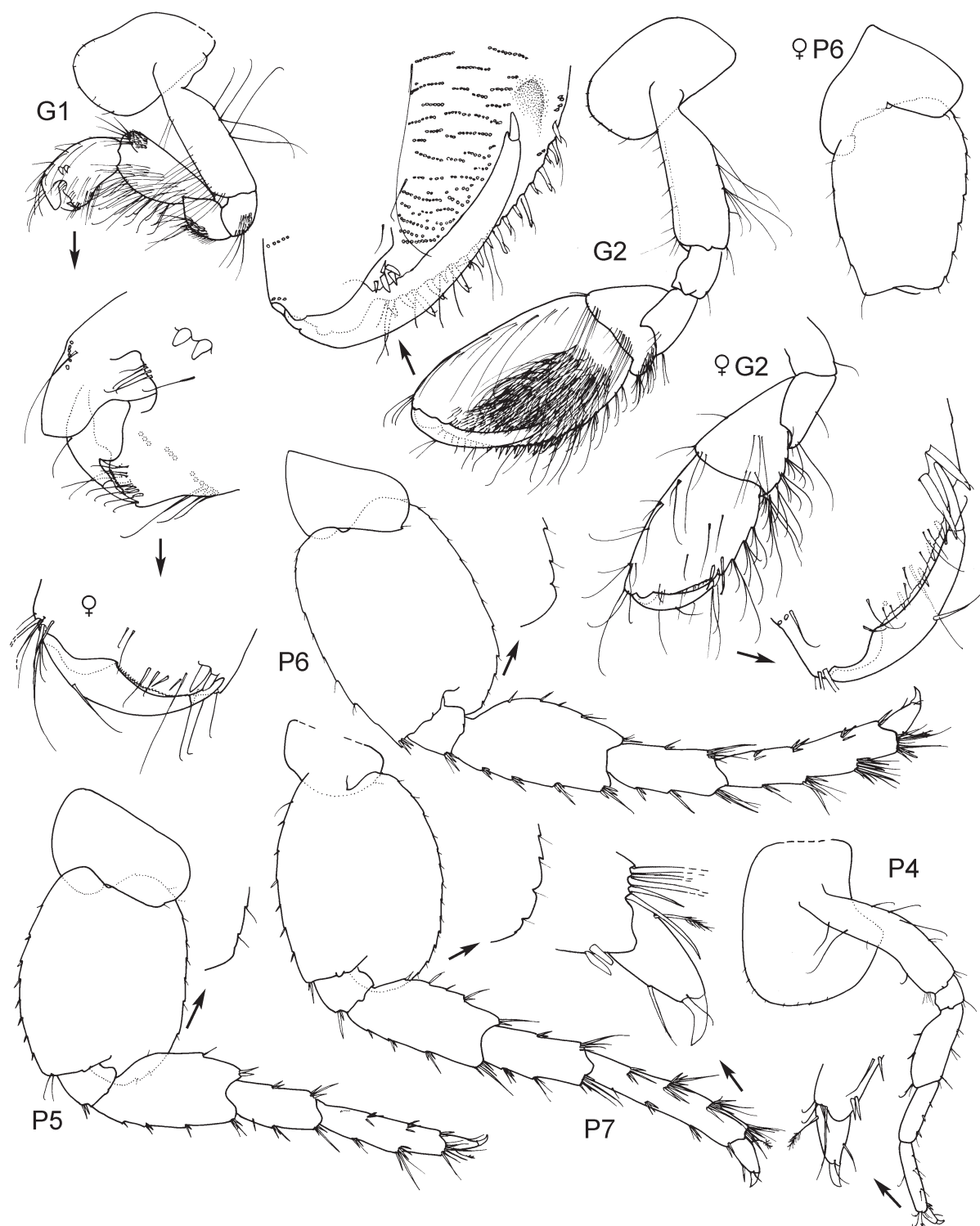


FIGURE 7. *Melita sampsonae* **sp. nov.**, holotype, male, 4.2 mm, AM P77779, paratype, female, 3.4 mm, AM P77780, Mermaid Cove, Lizard Island, Great Barrier Reef.

Habitat. Brackish littoral.

Remarks. *Melita sampsonae* appears to be part of a closely related group of species: *M. bingoensis* Yamato, 1987, *M. koreana* Stephensen, 1944, *M. nagatai* Yamato, 1987 (from Japan and Korea), *M. pahuwai* J.L. Barnard, 1970 (from Hawaii) and *B. intermedia* Sheridan, 1979 (from Florida, USA). These species all

have a triangular-shaped posterodistal hood on the propodus of male gnathopod 1, an upproduced anterodistal corner on the coxa of gnathopod 1, a medial depression on the propodus of gnathopod 2, a well developed posteroventral lobe on coxa 4, sexually dimorphic coxa 6 and a small acute spine defining the posteroventral corner of epimeron 3. *Melita sampsonae* differs from all of these species in the relatively short, broad outer ramus on uropod 3.

Melita sampsonae differs most obviously from *M. myersi*, the only other *Melita* known from the GBR as follows: antenna 1 about as long as antenna 2 (much longer in *M. myersi*); anterodistal hood on propodus of male gnathopod 1 triangular (rounded in *M. myersi*); dactylus closing across palm of strongly setose propodus of male gnathopod 2 (dactylus closing along palm of sparsely setose propodus in *M. myersi*); coxa of pereopod 4 with well developed posteroventral lobe (lobe absent in *M. myersi*); posteroventral corner of epimeron 3 a small acute spine (a strongly produced spine in *M. myersi*); and the outer ramus of uropod 3 has 2 articles (1 article in *M. myersi*).

Distribution. *Australia.* Queensland: Mermaid Cove, Lizard Island (current study).

***Tegano* Barnard & Karaman, 1982**

Tegano Barnard & Karaman, 1982: 176. —Barnard & Barnard, 1983: 674. —Sawicki & Holsinger in Sawicki, Holsinger & Iliffe, 2005: 49.

Type species. *Melita seticornis* Bousfield, 1970, original designation.

Quadrus G. Karaman, 1984: 132.

Type species. *Quadrus vagabundus* G. Karaman, 1984, original designation.

Sriha Stock, 1988: 89 (replacement name for *Quadrus*, preoccupied).

Caledopisa Stock & Iliffe, 1995: 264.

Type species. *Caledopisa levis* Stock & Iliffe, 1995, original designation.

Included species. *Tegano* includes 8 species: *T. atkinsae* **sp. nov.**; *T. barnardi* Sawicki & Holsinger, 2005; *T. clavatus* Sawicki & Holsinger, 2005; *T. levis* (Stock & Iliffe, 1995); *T. panglaoensis* Sawicki & Holsinger, 2005; *T. seticornis* (Bousfield, 1970); *T. shiodamari* (Yamato, 1995); *T. vagabundus* (G. Karaman, 1984).

Diagnosis. Mandibular palp reduced in size, with 1 to 3 articles; if 3 articles then article 2 longer than article 3. Maxilla 1 inner plate long, subrectangular with distal setae. Maxilla 2 inner plate without oblique setal row, with setae along inner margin. Lower lip with inner lobes. Gnathopod 1 coxa anteroventral corner not produced. Gnathopod 2 dactylus closing across palm. Pereopod 4 coxa, posteroventral lobe absent. Uropod 3 inner ramus scale-like; outer ramus much longer than peduncle, with 2 articles.

Remarks. A number of authors (eg. Karaman 1984; Stock & Iliffe 1995; Sawicki, Holsinger & Iliffe 2005) have considered the reduced mandibular palp as a diagnostic character for *Tegano*. This is probably a good generic level character, but the amount of reduction appears to vary among species. Based mainly on the reduced number of articles in the mandibular palp, Sawicki, Holsinger & Iliffe (2005) placed five species in *Tegano*: *T. barnardi* Sawicki & Holsinger, 2005; *T. clavatus* Sawicki & Holsinger, 2005; *T. panglaoensis* Sawicki & Holsinger, 2005; *T. seticornis* (Bousfield, 1970); and *T. vagabunda* (G. Karaman, 1984). Based on the amended diagnosis presented above, three additional species are included in the genus, *T. atkinsae* **sp. nov.**, from the Great Barrier Reef, *T. levis* (Stock & Iliffe, 1995) from New Caledonia and *T. shiodamari* (Yamato, 1995) from Japan. All species in this genus occur in reduced salinities or freshwater habitats near the sea or in marine habitats with freshwater input.

***Tegano atkinsae* sp. nov.**

(Figs 8, 9)

Type material. Holotype, male, 5.0 mm, AM P77777, Ferriers Creek, Lizard Island, Queensland, Australia (14°39.95'S 145°27.05'E), algae from among roots at edge of mangroves (*Rhizophora stylosa*), surface, A.

Myers, 25 February 2005 (QLD 1680). Paratypes: 1 male, 5.2 mm, AM P77961 (JDT/LIZ 4); 1 female, 4.3 mm, AM P77778; 10 males, 3 females, AM P70900 (QLD 1680); 8 males, 4 females, AM P77960 (JDT/LIZ 4); 2 specimens AM P70803 (QLD 1655); 1 female, AM P70925 (QLD 1677).

Type locality. Ferriers Creek, Lizard Island, Queensland, Australia (14°39'56"S 145°27'3"E).

Etymology. Named for Lisa Atkins, one of the great cooks of Pittwater, and provider of nourishing sustenance for the participants of the Lizard Island Amphipod Workshop.

Description. Based on holotype, male, AM P77777 and paratype female, AM P77778.

Head. *Head* lateral cephalic lobe broadly rounded; eyes ovate; anteroventral margin without notch-slit, excavate, anteroventral corner rounded. *Antenna 1* slightly longer than antenna 2; peduncular article 1 shorter than article 2, with 2 robust setae along posterior margin; peduncular article 2 longer than article 3; accessory flagellum minute, with 3 articles (third tiny); flagellum with 11+ articles. *Antenna 2* strongly setose; peduncular article 4 subequal to article 5; flagellum with 9 articles. *Mandible* molar medium size; accessory setal row well developed; palp reduced in size, 3-articulate; article 1 about twice as long as broad, shorter than article 2, inner margin article 1 not produced distally; article 2 longer than article 3; article 3 shorter than article 1, cone-like, with a terminal long whip-like seta. *Maxilla 1* inner plate long, subrectangular, with 8 mainly apical setae. *Maxilla 2* inner plate without oblique setal row, with marginal setal row. *Lower lip* inner lobes present. *Maxilliped* palp article 3, about as long as broad.

Pereon. *Gnathopod 1* coxa anteroventral corner not produced, anterior margin straight, not produced, posteroventral corner notch absent; merus without posterodistal tooth; carpus about 2 x as long as broad, palm without produced lobe, carpus subequal in length to propodus, length 1.2 x propodus, without anterodistal swelling; propodus small, linear, with slight hump along anterior margin, without anterodistal projection, palm nearly transverse, sinusoidal, partially excavate, without anterodistal projection near base of dactylus, posterodistal margin slightly swollen, defined by posterodistal corner, without posterodistal robust setae; dactylus articulating distinctly with propodus, well developed, fitting palm, posterior margin swollen at base. *Gnathopod 2* significantly enlarged in male and female; sexually dimorphic; subchelate; coxa posteroventral corner notch absent; carpus short, length 1.2 x breadth, not lobate, not enclosed by merus and propodus; merus acutely produced distoventrally; propodus expanded, without strong concentration of setae, propodus with medial depression, forming distomedial hollow, palm acute in male and female, palm acute with well defined corner, sinusoidal, smooth, with group of anterodistal robust setae, without teeth along margin, defined by posteroventral corner, without posterodistal robust setae, with well defined corner in male and female, male both propodi with well defined corner (greater than 90°); dactylus closing across medial surface of propodus, reaching end of palm, with 1 or 2 setae on anterior margin, inner margin smooth, apically acute/subacute. *Pereopod 4* coxa posteroventral lobe absent, posterior margin straight. *Pereopod 5* basis slightly expanded; posterior margin slightly convex, posteroventral corner narrowly rounded or subquadrate. *Pereopod 6* coxa not sexually dimorphic, slightly produced, rounded; basis posterior margin straight, posteroventral corner subquadrate. *Pereopod 7* basis posterior margin expanded posteroproximally, tapering distally, posterodistal corner narrowly subquadrate.

Pleon. *Pleonites 1–3* dorsally smooth. *Urosomite 1* without a small dorsal hump; smooth; with 1 dorsodistal spine. *Urosomite 2* with 2 small dorsal robust setae. *Urosomite 3* without dorsal setae. *Uropod 1* peduncle without distoventral spur; with basofacial robust seta; inner ramus not modified. *Uropod 2* rami slender, apically acute. *Uropod 3* rami distally truncated, apical robust setae short; inner ramus scale-like, much shorter than outer ramus; outer ramus very long, length 6.5 x breadth, much longer (about 3 x) than peduncle, 2-articulate, article 2 long. *Telson* cleft, slightly broader than long, tapering distally, lobes apically acute or subacute, without dorsal robust setae, each lobe with 3 or more apical/subapical robust setae, with robust setae on outer margins, absent on inner margins, apical conical extension absent.

Habitat. Living in algae from among roots at edge of mangroves (*Rhizophora stylosa*).

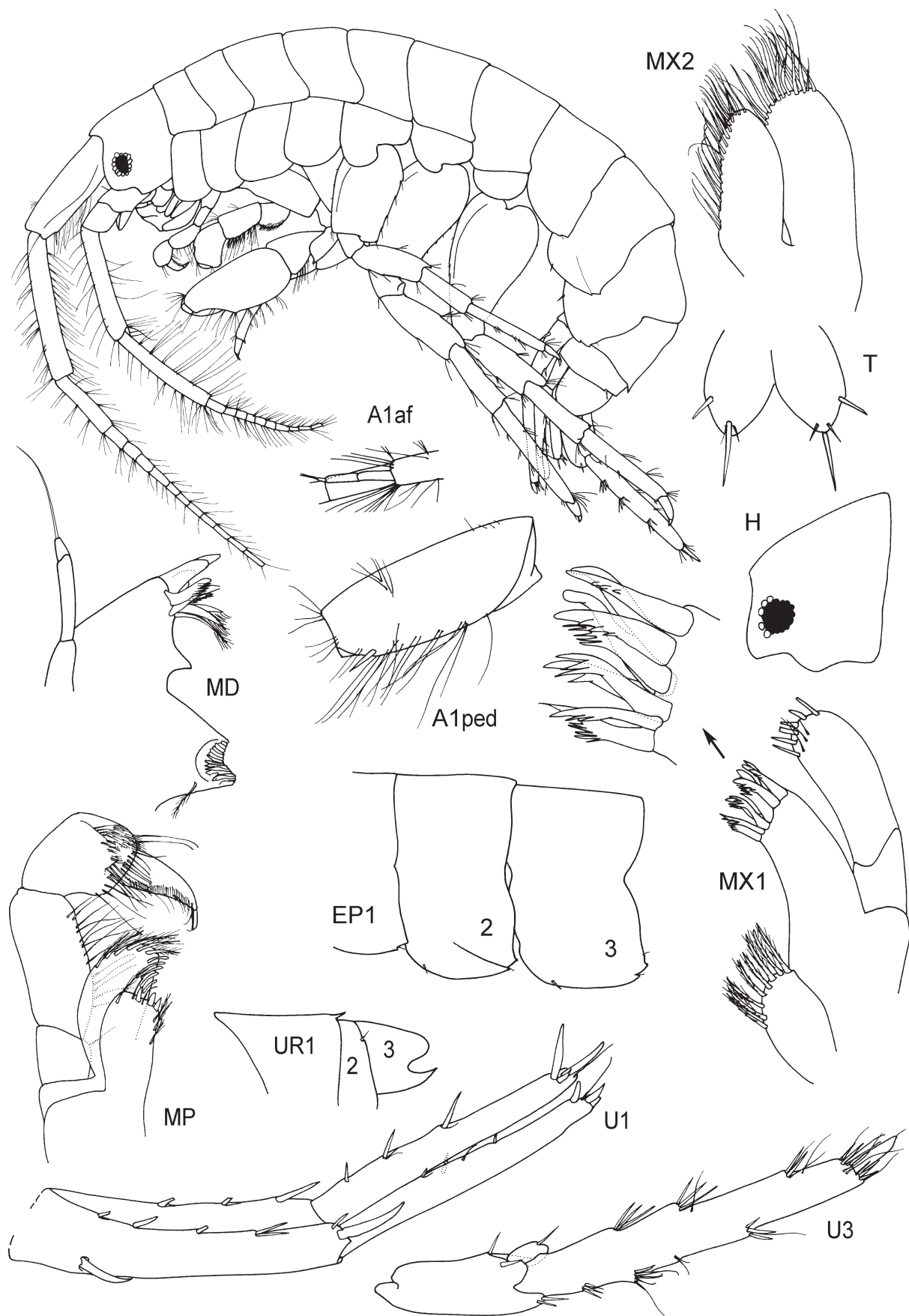


FIGURE 8. *Tegano atkinsae* sp. nov., holotype, male, 5.0 mm, AM P77777, habitus, paratype, male, 5.2 mm, AM P77961, Ferriers Creek, Lizard Island, Great Barrier Reef.

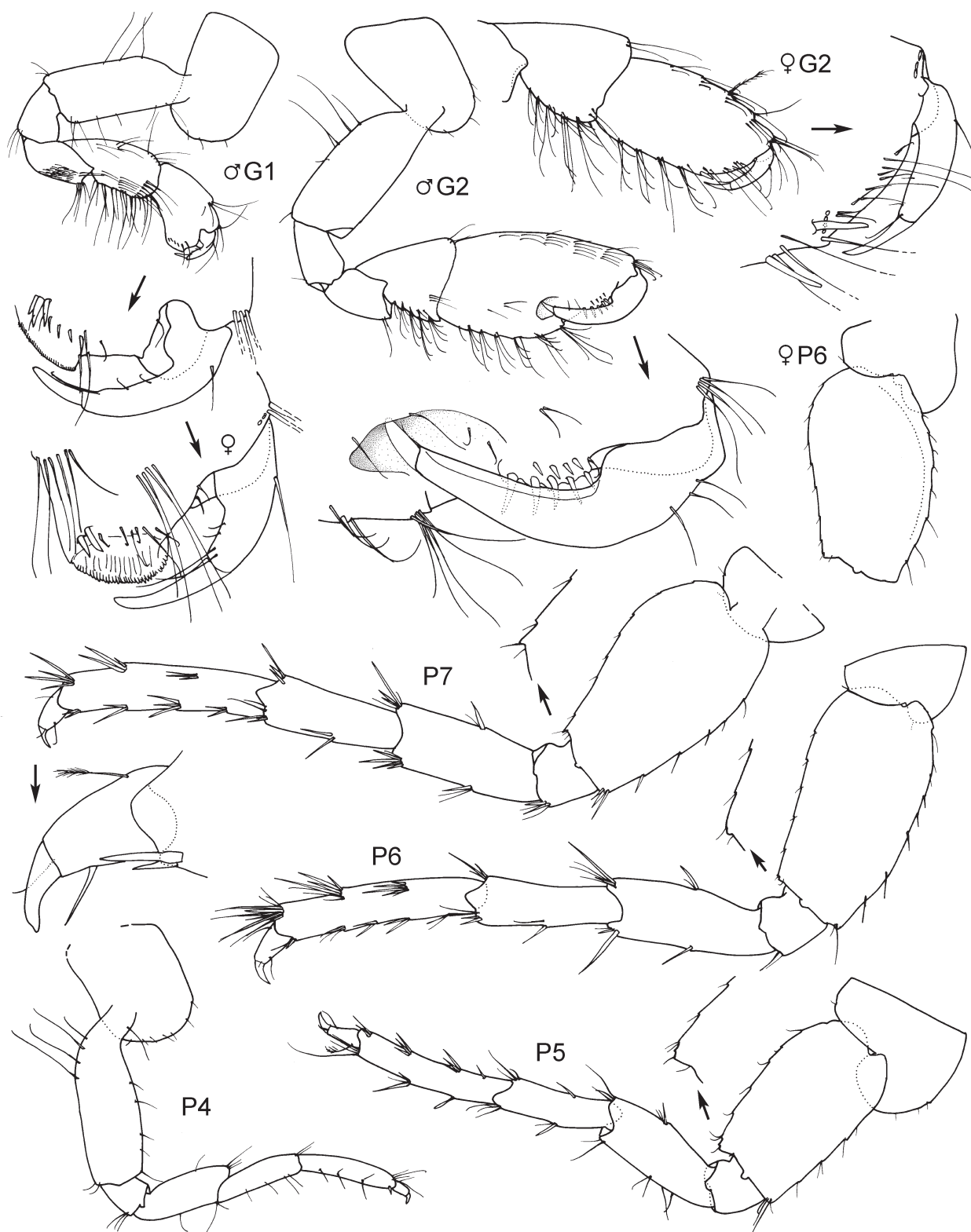


FIGURE 9. *Tegano atkinsae* **sp. nov.**, holotype, male, 5.0 mm, AM P77777, paratype, female, 4.3 mm, AM P77778, Ferriers Creek, Lizard Island, Great Barrier Reef.

Remarks. *Tegano atkinsae* **sp. nov.** is very similar to *T. levis* (Stock & Iliffe, 1995) from New Caledonia. They differ as follows: *T. atkinsae* has 1 robust seta along posterior margin of antenna 1 peduncular article 1 (2 in *T. levis*); *T. atkinsae* has a better developed antenna 2 flagellum with about 11 articles (about 5 articles in

T. levis); male gnathopod 2 palm with a group of anterodistal robust setae in *T. atkinsae* (with group of slender setae with 1 large, mid-palmar robust seta in *T. levis*); epimera 1–3 with sparse slender setae along posterior margin in *T. levis* (epimera 1–2 without setae along posterior margin, epimeron 3 with 1 tiny posterodistal seta); uropod 3 outer ramus with 9 setae in 3 clumps along inner margin in *T. atkinsae* (about 10 setae in 5 clumps along inner margin in *T. levis*).

Tegano atkinsae is also similar to *T. shiodamari* (Yamato, 1995) from southern Japan. They differ as follows: *T. atkinsae* has 1 robust seta along posterior margin of antenna 1 peduncular article 1 (2 in *T. shiodamari*); epimeron 1 with a subquadrate posterodistal corner (broadly rounded in *T. shiodamari*); epimeron 2 with an acute posteroventral corner plus small spine on posterodistal ventral margin (subacute with smooth ventral margin); uropod 3 outer ramus with 9 setae in 3 clumps along inner margin (5 setae in continuous row along inner margin in *T. shiodamari*).

Distribution. *Australia.* Queensland: Lizard Island (current study).

Acknowledgements

We thank all our colleagues, but particularly Alan Myers and Sara LeCroy, for their intensive collecting from Mermaid Cove, Ferriers Creek and Mangrove Beach, which turned up such unexpected bolittsiid, hadziid and melitid amphipods.

References

- Barnard, J.L. (1965) Marine Amphipoda of atolls in Micronesia. *Proceedings of the United States National Museum*, 117, 459–551.
- Barnard, J.L. (1970) Sublittoral Gammaridea (Amphipoda) of the Hawaiian Islands. *Smithsonian Contributions to Zoology*, 34, 1–286.
- Barnard, J.L. & Barnard, C.M. (1983) Freshwater Amphipoda of the World. Vol. I. Evolutionary Patterns. Vol. II. Handbook and Bibliography. In: Hayfield Associates, Mount Vernon, Virginia, pp. 830.
- Barnard, J.L. & Karaman, G.S. (1982) Classificatory revisions in gammaridean Amphipoda (Crustacea), Part 2. *Proceedings of the Biological Society of Washington*, 95, 167187.
- Berents, P.B. (1983) The Melitidae of Lizard Island and adjacent reefs, The Great Barrier Reef, Australia (Crustacea: Amphipoda). *Records of the Australian Museum*, 35, 101–143.
- Bousfield, E.L. (1970) Terrestrial and aquatic amphipod crustacea from Renell Island. *The Natural History of Rennell Island, British Solomon Islands*, 6, 155–168.
- Bousfield, E.L. (1973) Shallow-water Gammaridean Amphipoda of New England. In: Cornell University Press, Ithaca and London, p. 312.
- Dallwitz, M.J. (2005) Overview of the DELTA System. <http://delta-intkey.com>. Last accessed (8/9/2007).
- Englisch, U., Coleman, C.O. & Wägele, J.W. (2003) First observations on the phylogeny of the families Gammaridae, Crangonyctidae, Melitidae, Niphargidae, Megaluropidae and Oedicerotidae (Amphipoda, Crustacea), using small subunit rDNA gene sequences. *Journal of Natural History*, 37, 2461–2486.
- Haswell, W.A. (1879) On Australian Amphipoda. *Proceedings of the Linnean Society of New South Wales* 4(3): 245–79, pls 7–12.
- Karaman, G.S. (1984) Contribution to the knowledge of the Amphipoda 141. *Quadrus vagabundus*, new genus and species, and revision of genus *Eriopisella* Chevr. (Gammaridea). *Studia Marina*, 15–16, 131–148.
- Karaman, G.S. (1987) A new species of the genus *Melita* Leach (fam. Melitidae) from Bermuda and Fiji Islands. Contribution to the knowledge of the Amphipoda 173. *Bulletin du Museum d'Histoire Naturelle, Belgrade, Series B*, 42, 19–35.
- Krapp-Schickel, T. (2008) What has happened with the Maera-clade (Crustacea, Amphipoda) during the last decade? *Bollettino del Museo Civico di Storia Naturale di Verona*, 32, 3–32.
- Leach, W.E. (1814) Crustaceology. *The Edinburgh Encyclopaedia*, 7, 383–429.
- Ledoyer, M. (1984) Les gammariens (Crustacea, Amphipoda) des herbiers de phanérogames marines de Nouvelle Calédonie (région de Nouméa). *Mémoires du Muséum National d'Histoire Naturelle, Series A, Zoology*, 129, 1–113.
- Ledoyer, M. (1986) Crustacés Amphipodes Gammariens. Familles des Haustoriidae à Vitjazianidae. *Faune de*

Madagascar, 59(2), 599–1112.

- Lowry, J.K. & Hughes, L. (2009) Maeridae, the *Elasmopus* Group. In: Lowry, J.K. & Myers, A.A. (eds), Amphipoda of the Great Barrier Reef, Australia. *Zootaxa*, 2260, 643–702.
- Lowry, J.K. & Myers, A.A. (2009) Foreword. In: Lowry, J.K. & Myers, A.A. (Eds), Benthic Amphipoda of the Great Barrier Reef, Australia. *Zootaxa*, 2260, 17–108.
- Lowry, J.K. & R.T. Springthorpe (2005) New and little-known melitid amphipods from Australian waters (Crustacea: Amphipoda: Melitidae). *Records of the Australian Museum*, 57(2), 237–302.
- Lowry, J.K. & Springthorpe, R.T. (2007) A revision of the tropical/temperate amphipod genus *Dulichchiella* Stout, 1912, and the description of a new Atlantic genus *Verdeia* gen. nov. (Crustacea: Amphipoda: Melitidae). *Zootaxa*, 1424, 1–62.
- Myers, A. A. (1985) Shallow-water, coral reef and mangrove Amphipoda (Gammaridea) of Fiji. *Records of the Australian Museum, Supplement*, 5, 1–143.
- Sawicki, T.R., Holsinger, J.R. & Iliffe, T.M. (2005) New species of amphipod crustaceans in the genera *Tegano* and *Melita* (Hadzioidea : Melitidae) from subterranean groundwaters in Guam, Palau, and the Philippines. *Journal of Crustacean Biology*, 25, 49–74.
- Sheridan, P.F. (1979) Three new species of *Melita* (Crustacea: Amphipoda), with notes on the amphipod fauna of the Apalachicola Estuary of northwest Florida. *Northeast Gulf Science*, 3, 60–73.
- Stebbing, T.R.R. (1904) Gregarious Crustacea from Ceylon. *Spolia Zeylanica*, 2, 1–29, pls 21–26.
- Stephensen, K. (1944) Some Japanese amphipods. *Videnskabelige Meddelelser fra Dansk Naturhistorisk Forening*, 108, 25–88.
- Stock, J.H. (1988) Two new stygobiont Amphipoda (Crustacea) from Polynesia. *Stygologia*, 4, 79–100.
- Stock, J.H. & Iliffe, T.M. (1995) Melitidae (Crustacea, Amphipoda) from anchihaline limestone caves in New Caledonia. *Contributions to Zoology*, 65, 245–269.
- Stout, V.R. (1912) Studies in Laguna Amphipoda. *First Annual Report of the Laguna Marine Laboratory*, 134–149.
- Yamato, S. (1987) Four intertidal species of the genus *Melita* (Crustacea : Amphipoda) from Japanese waters, including descriptions of two new species. *Publications of the Seto Marine Biological Laboratory*, 32(4/6), 275–302.
- Yamato, S. (1995) A new species of the genus *Melita* (Crustacea : Amphipoda) from a high tide pool at Shirahama on the west coast of the Kii Peninsula, Japan. *Publications of the Seto Marine Biological Laboratory*, 36, 379–388.